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No. 07-

Supreme Court, U.S.
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THE SUPREME COURT OF THE UNITED STATES

MOTIONLESS KEYBOARD COMPANY,
Petitioner,

v.

MICROSOFT CORPORATION,
Respondent,

and

NOKIA INC.,
Respondent,

and

SAITEK INDUSTRIES LTD.,
Respondent.

On Petition for Writ of *Certiorari* to The United States Court of Appeals for the Federal Circuit

PETITION FOR WRIT OF *CERTIORARI*

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October 26, 2007

Questions Presented for Review

1. Did the Court of Appeals abuse its discretion in denying without any explanation Petitioner's request for thirty additional days to petition for rehearing, where Petitioner was an impecunious inventor who had just suffered a fire that destroyed Petitioner's property, no other party objected to such extension of time, and through the denial Petitioner was prevented from bringing serious errors of fact and law to the attention of the Court of Appeals?

2. Did the Court of Appeals err in reversing the burden of proof and establishing a heightened evidentiary standard to avoid summary judgment dismissing claims of infringement premised on application of the doctrine of equivalents, by holding, as a matter of law that respondents Microsoft Corporation, Nokia Corporation, and Saitek did not infringe U.S. Patent No. 5,323,322 (hereafter, the '322 patent)?

Corporate Disclosure Statement

Motionless Keyboard Company has no parent corporations or publicly-held companies owning 10% or more of its stock.

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Citations to Opinions and Orders

The District Court's opinions are reported as *Motionless Keyboard Co. v. Microsoft Corp.*, 2004 WL 1274401 (June 9, 2004) (pleading matter), 2005 WL 1113818 (May 6, 2005) (substantive rulings), and 2005 WL 1899377 (Aug. 5, 2005) (inventor attempts to intervene to appeal case *pro se*). An initial opinion of the Court of Appeals rejecting the inventor's attempt to appeal *pro se* is reported as *Motionless Keyboard Co. v. Microsoft Corp.*, 184 Fed. Appx. 967, 2006 WL 1666699 (June 8, 2006).

The opinion of the Court of Appeals of which review is sought is reported as *Motionless Keyboard Co. v. Microsoft Corp.*, 486 F.3d 1376, 82 U.S.P.Q.2d 1801 (2007).

Statement Concerning Jurisdiction

Judgment was entered by the Court of Appeals on May 29, 2007. The Court of Appeals denied Petitioner's request for a thirty-day extension of time in which to petition for rehearing on June 14, 2007 (A20-21). On August 28, 2007, this Court granted an extension of time to and including October 26, 2007 to petition for a writ of *certiorari*. This Court has jurisdiction pursuant to 28 U.S.C. § 1254.

Pertinent Statutes and Rules

The pertinent statute is 35 U.S.C. § 271(a), which provides:

> "Except as otherwise provided in this title, whoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor, infringes the patent."

The pertinent rule is Rule 40(a) of the Federal Rules of Appellate Procedure:

> "Unless the time is shortened or extended by order or local rule, a petition for panel rehearing may be filed within 14 days of entry of judgment. But in a civil case, if the United States or its officer or agency is a party, the time within which any party may seek rehearing is 45 days after entry of judgment, unless an order shortens or extends the time."

Concise Statement of the Case

As the Court of Appeals explained, the inventor here

> ". . . invented the novel ergonomic keyboard technology on a part-time basis while also working in other jobs such as graphic artist and dishwasher. In fact, Mr. Gambaro developed some of the ergonomic keyboard technology while he lived in a friend's attic. As an independent inventor, Mr. Gambaro developed his technology

> advances without the benefit of a well funded laboratory and then traversed the patent system on a limited budget." (A2-3.)

He has also been required to "traverse the legal system" on an extremely limited budget. (*See generally* Motion to Extend the Time for Filing a Petition for Writ of Certiorari, Aug. 21, 2007, at 2-3.)

Notwithstanding such significant practical handicaps, Petitioner sought and obtained the '322 patent, which disclosed a novel invention through which operators of handheld devices could actuate the keyboards of electronic devices using not only the tips of their thumbs, but also the thumb joints.

The patent is simple and not highly technical in nature. The first claim, and only independent claim, discloses:

> "A hand-held device for entering information into an electronic system via a keyboard, the device comprising:
>
> - "a housing having a grippable portion which permits the device to be held in one hand with the thumb free to move at least temporarily to a predetermined key-actuation position while the device is held,
>
> - "a concavity in said housing at said key-actuation position, and
>
> - "a thumb-associable cluster of keys forming a keyboard within said concavity, each of the plurality of keys in said cluster being selectively

actuable via mixed lateral, and slight endo, translation of a thumb within said concavity, whereby information is entered into an electronic system." (A48-49.)

The specifications disclosed a variety of embodiments of the invention (A28-29, 32), two of which are reproduced below next to:

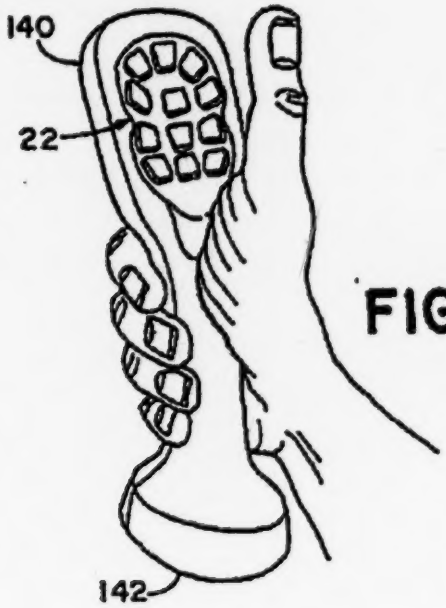


FIG.7

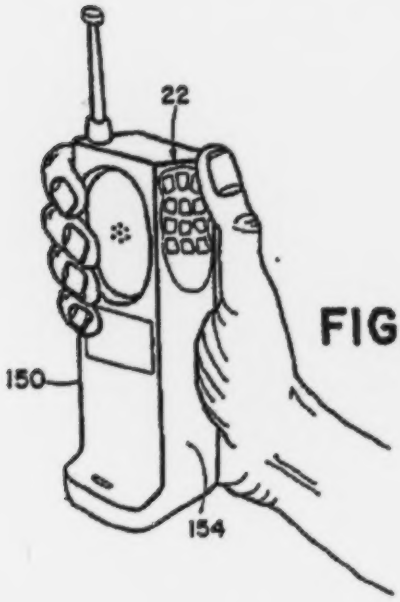
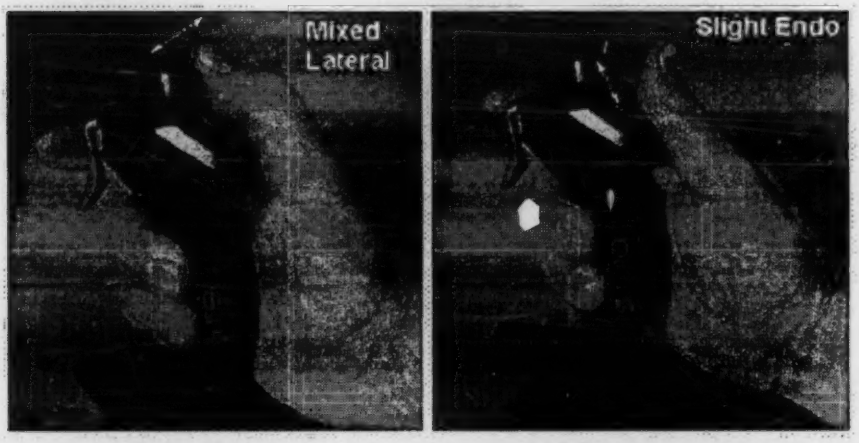
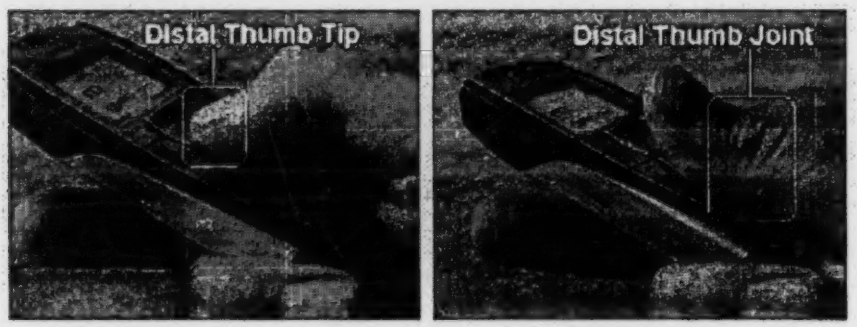


FIG.8

Petitioner claimed that two sets of hand-held electronic devices infringed the '322 patent: certain computer joysticks (produced by defendants Microsoft Corp. and Saitek Industries) and certain cellular phones (produced by defendant Nokia Inc.), all of which constitute devices quite similar in appearance and use to the claimed invention:



(From page 919 of the Court of Appeals Appendix, showing a "mixed lateral . . . translation of a thumb within said concavity" (A49) formed by the expanded key surfaces of a Saitek joystick.)



(From page 864 of the Court of Appeals Appendix, showing dialing with the thumb joint within the concavity of a Nokia phone.)

Before the Court of Appeals, the controversy focused on whether the accused products contained a "concavity" in the housing, with a "keyboard within said concavity".

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With respect to the joystick products, the Court of Appeals denied literal infringement on the basis that the accused products show "a lack of a concavity and a lack of keys sunk completely within the concavity and below the housing". (*See* A9.) With respect to the Nokia products, the Court characterized them as containing "keys protruding through an opening in the housing" rather than being "within said concavity". (A10.)

When Petitioner and two other parties sought additional time to present a petition for rehearing, or rehearing *en banc*, the Court of Appeals denied the motions without explanation. (A20-21.) The Court of Appeals had jurisdiction over Petitioner's appeal from the final judgment of the District Court pursuant to 28 U.S.C. § 1291.

Argument

I. BY DENYING PETITIONER'S MOTION FOR ADDITIONAL TIME TO PETITION FOR REHEARING, THE COURT OF APPEALS DEPARTED FROM THE ACCEPTED AND USUAL COURSE OF JUDICIAL PROCEEDINGS SO AS TO CALL FOR AN EXERCISE OF THIS COURT'S SUPERVISORY POWER.

Rule 40 of the Federal Rules of Appellate Procedure provides that a petition for rehearing must be filed within 14 days after entry of judgment. Where any federal agency or official is a party, the deadline is extended to 45 days. Inasmuch as the Court of Appeals mails out its opinions and

judgments, those on the West Coast may have as little as a week to petition for rehearing to the extent they cannot afford constantly to monitor developments in their case.

Upon receipt of the opinion, Petitioner immediately moved on June 12, 2007 for a thirty-day extension of time to seek rehearing. Petitioner offered two grounds for the motion. First, Petitioner explained that the inventor "was involved in an apartment fire in May that has caused him to suffer eviction proceedings; he has had to move to new lodgings; and as a result has not been able adequately to consider the options of [Petitioner] in the wake of the panel opinion". (A23.) Second, Petitioner noted that it "has also received proposals from certain defendants concerning possible settlement" and "requires additional time to make informed choices concerning these patents and the infringement claims". (*Id.*)

Two of the defendants, Nokia Inc. and Saitek Industries, also moved for the same extension of time (*see* A21); none of the parties to the appeal opposed Petitioner's motion. Nonetheless, on June 14, 2007, the Court of Appeals denied both motions without explanation. (*Id.*) In the accepted and usual course of judicial proceedings, discretionary rulings are to be accompanied with findings explaining the exercise

of discretion.[1]

In assessing whether or not the Court of Appeals has so departed from the accepted and usual course of judicial proceedings so as to call for an exercise of this Court's supervisory power, the Court should consider carefully the balance of interests involved. Two fundamental policies counseled in favor of granting of the motion, with no countervailing policy considerations of substance. First, it is axiomatic that the federal judiciary will, in the absence of countervailing considerations, seek to promote settlement of disputes. The moving parties all averred that additional time was required in order to conclude settlement negotiations, and no party objected. (*See* A23-24.) Yet the Court of Appeals offered no reason for denying the motion and thereby short-circuiting the settlement process.

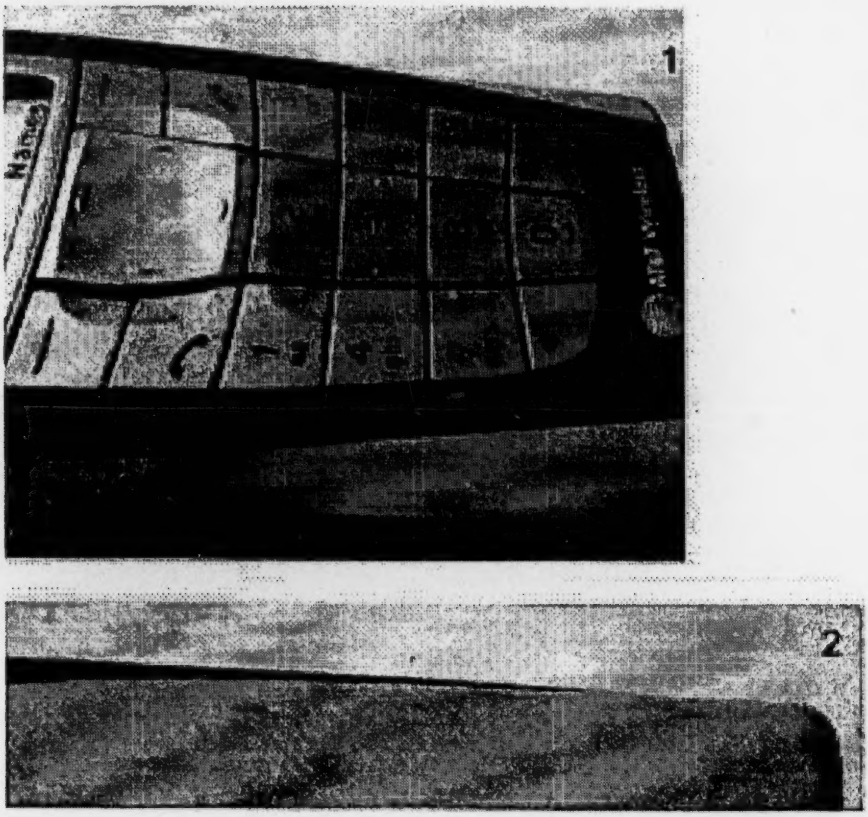
Second, the Rule embodies a policy of affording litigants sufficient time to analyze and respond to decisions from the courts of appeals, going so far as to afford a categorical extension to 45 days for a class of litigants subject to cumbersome decision-making processes: federal agencies and officials. (*See* Fed.

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[1] *Cf., e.g., Belizan v. Hershon*, 495 F.3d 686, 694 (D.C. Cir. 2007) (remanding dismissal of amended complaint because it was "not sufficient for the district court simply to wave away plaintiffs' attempt to cure the deficiencies"); *Jones v. UNUM Life Ins. Co. of America*, 223 F.3d 130, 138 (2d Cir. 2000) (remanding attorney fee award for findings because "reviewable for 'abuse of discretion' is not the equivalent of 'unreviewable'); *Schwarz v. Folloder*, 767 F.2d 125, 133 (5th Cir. 1984) (remanding fee award because "[a] statement of reasons is one of the handmaidens of judging").

R. App. P. 40 Advisory Committee Notes (1994 Amendment).) If courts of appeals are given free reign to deny private citizens the same consideration—even after an evidentiary showing that they require such consideration—serious questions as to the equal protections of the laws would be raised.

Most importantly to Petitioner, in this case, denial of additional time to seek leave for rehearing was especially destructive of Petitioner's rights because Petitioner lost the opportunity to explain to the panel how it had made several critical factual and legal errors with respect to its resolution of the claims for infringement and other issues. As noted above, the focal point of dispute was whether the accused devices contained a "concavity" in their "housing", and a "keyboard within said concavity". With respect to the Nokia phones, the Court of Appeals finding that "keys protrude through an opening in the housing" (A10), rather than being "within said concavity", was simply wrong with respect to some of the accused products. The Court appears to have simply pointed to demonstrative evidence prepared by Nokia making this claim rather than examining the photographs of the phones (*e.g.*, the Nokia Model 6200):



(From pg. 168 of the Court of Appeals Appendix.)

In insisting that each and every key on the accused products lie within a "concavity", the Court of Appeals also overlooked a long-standing rule of claim construction: an accused device does not escape a claim of infringement merely because it contains additional features (such as additional keys that extend beyond the concavity). *See, e.g., Vulcan Engineering Co. v. Fata Aluminum, Inc.*, 278 F.2d 1366, 1376 (Fed. Cir. 2002). And as set forth in Point II, the panel invented new and improper hurdles for Petitioner to find no infringement as a matter of law under the doctrine of equivalents.

The only apparent policy *against* granting the motion for additional time is that set forth in the Advisory Committee Notes, which report that Rule 40 was adopted "to save time and expense to the party victorious on appeal". Fed. R. App. P. 40 Advisory Committee Notes (1967 adoption). But that policy manifestly has no weight where, as here, the victorious parties do not oppose the motion for more time.

Acceptance of the Petition, particularly if accompanied by summary disposition on the merits pursuant to Rule 16.1, would require rehearing in the Court of Appeals, and thereby provide important guidance to the courts of appeals that uncontested motions for extension of time to petition for rehearing should not be denied without explanation. It would serve to encourage the courts of appeal to consider in the first instance errors identified by the litigants, potentially reducing the burden upon this Court.

II. WHETHER THE ORDINARY BURDEN OF PROOF SHOULD BE REVERSED AND HEIGHTENED SUMMARILY TO DESTROY CLAIMS FOR INFRINGEMENT UNDER THE DOCTRINE OF EQUIVALENTS IS AN IMPORTANT QUESTION OF FEDERAL LAW THAT HAS NOT BEEN, BUT SHOULD BE, SETTLED BY THIS COURT.

Under Rule 56, in order to avoid summary judgment for non-infringement, Petitioner was merely required to show that there was a "genuine issue of material fact", Fed. R. Civ. P. 56(c). More

specifically, it was the duty of the Court of Appeals to "ascertain what material facts exist without substantial controversy and what material facts are actually and in good faith controverted", Fed. R. Civ. P. 56(d).

Instead, the Court of Appeals has created, is enforcing generally, and enforced in this case a novel rule requiring special, heightened proof to avoid summary judgment in doctrine of equivalents cases. Specifically, the Court of Appeals enforced an additional requirement of "particularized evidence and linking argument as to the 'insubstantiality of the differences' between the claimed invention and the accused device". (A11 (quoting *PC Connector Solutions LLC v. SmartDisk Corp.*, 406 F.3d 1359, 1364 (Fed. Cir. 2005)).

The Court of Appeals explicitly made it Petitioner's "burden to present [such] particularized evidence" in order to avoid summary judgment (A12), thereby reversing the normal burden of proof. It is true that since *Celotex Corp. v. Catrett*, 477 U.S. 317 (1986), nonmoving parties may not simply rest on their pleadings when a motion for summary judgment is filed against them, but summary judgment is not to be entered absent a "complete failure of proof concerning an essential element of the nonmoving party's case". *See id.* at 323; *see also United States v. Diebold, Inc.*, 369 U.S. 654, 655, 82 S. Ct. 993, 994 (1962) ("On summary judgment the inferences to be drawn from the underlying facts contained in evidentiary materials must be viewed in the light most favorable to the party opposing the motion"). Here there was no "complete failure of

proof", but a failure to meet some novel, higher standard it was not properly plaintiff's burden to meet.

The requirement of "particularized evidence" is somewhat opaque, but it is clear in the context of the comparatively simple facts of this case that it amounts to something more than showing a genuine issue of material fact. As noted above, Petitioner claimed that two sets of hand-held electronic devices infringed the '322 patent: joysticks and cellular phones.

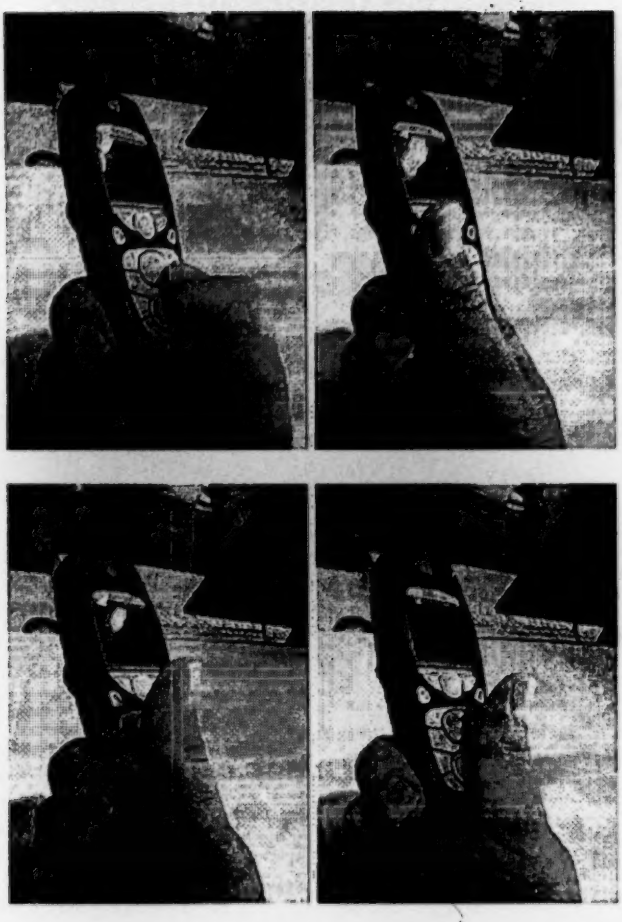
Petitioner offered detailed product-by-product claim charts, prepared by its patent attorney, with assistance from the inventor, which compared the elements of the claimed invention with the accused products. There is no dispute that in each case, with respect to the disputed elements, the charts explained that the element was present "structurally or equivalently", and identified the corresponding elements in the accused product. *See also* A12 (Court appears to acknowledge that claim charts show "substantial similarities of form, function and result").

The particular "equivalents" dispute concerned whether or not a concavity formed by the top surface of the keys themselves was the functional equivalent of a concavity in the housing. Petitioner took the position that using larger, keys arrayed in concave form that perform some of the function of the housing (*i.e.*, covering the innards), rather than small, flat keys located within a depression in the housing itself was an insubstantial change. This has

long been the law established by this Court. *See, e.g., Union Paper-Bag Machine Co. v. Murphy*, 97 U.S. 120, 125 (1877) ("if two devices do the same work in substantially the same way, and accomplish substantially the same result, they are the same, even though they differ in name, form or shape").

Specific testimony was offered by the inventor that "a concavity formed by the top surfaces of a cluster of keys is the functional equivalent of a concavity in the housing". (His sworn declaration to this effect appeared at pg. 1002 of the Court of Appeals Appendix.) He also stated: "I think it would be obvious to one reasonably skilled in the art of ergonometric keyboard design, such as myself, that the two are interchangeable". (*Id.*)

Nevertheless, the Court of Appeals affirmed without further explanation the District Court's suggestion that Petitioner had offered "no evidence" that the joysticks "perform 'substantially the same function in substantially the same way to obtain the same result'". (A12 (quoting District Court).) Yet the claim charts had contained detailed photographic evidence showing that the tip and joint actuation method taught in the patent was employed, achieving the same function (actuating switches) in the substantially the same way (with the tips and joints) to obtain the same result (actuating the same switches that might have been oriented within a concavity in the housing):



(From pg. 872 of the Court of Appeals Appendix; *see also, e.g., supra* p. 6 (same sort of photographic evidence for joysticks).)

In holding that Petitioner "did not offer any *particularized* testimony to *specifically* show that the keys work in the same way" (A13; emphasis added), the Court of Appeals manifestly established a standard requiring Petitioner to do more than merely demonstrate that the issue was genuinely contested. In so doing, the Court of Appeals removed from the jury the opportunity to consider whether the accused products were "the same in kind, and effected by the

employment of [the patentee's] mode of operation in substance". *Winans v. Denmead*, 56 U.S. 330, 344, 14 L.Ed. 717 (1853).

Triers of fact would have been unlikely to conclude, as did the Court of Appeals, that "[w]hile the patentee's invention points to actuation of the keys by a thumb movement within the concavity, a user would actuate the Nokia keys by pressing them downward". (A13). In so holding, the Court of Appeals missed the entire point of the invention, which addressed design such that more than one part of the thumb could be pressed downward into the keys through "slight gestural movements" (A44).

In particular, it was obvious from the '322 specifications that a user of the invention, just like the user of the accused products, would tend to hold them with the thumb positioned above the concavity, and activate the keys with a downward motion. Specifically, Figure 4 showed the thumb in just such a position:

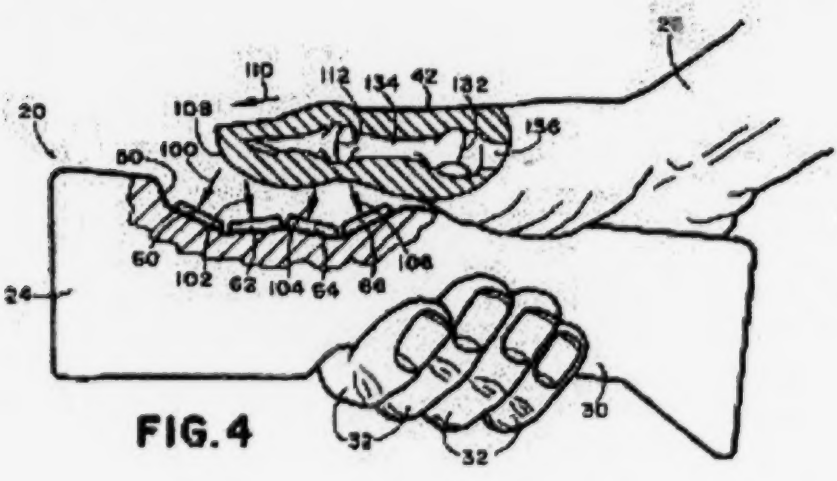


FIG. 4

The ordinary positioning—but not ordinary dialing motion—of the thumb is also set forth in Dependent Claim 5, which refers to a "device as in Claim 1" where "the user's thumb is selectively movable into said concavity without the user losing a grip on the device" (A50). The ergonomic innovation of the patent is that after the thumb is "rotated downwardly onto the keyboard" (and thus "within said concavity", whether formed by the key surfaces or depression in the housing), "each key in the keyboard can be actuated by slight gestural movements of the thumb" (A44). Those movements exert downward force in the directions identified above in Figure 4. (*Id.*)[2]

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[2] Also before the Court of Appeals (at pg. 827 of the Court of Appeals Appendix) was testimony from the patent attorney to this effect:

> "There has been continuing controversy in this case concerning the meaning of the phrase "mixed lateral, and slight endo, translation of a thumb within said concavity". There is a unique key actuation method taught in the '322 patent, most precisely in its specifications (Col. 6:30-42 [A44-45]), and this phrase represents my attempt to describe the method. I employed the term 'endo' in an attempt to capture the difference between this key actuation method and the more conventional means that involves simply moving the tip of the finger or thumb over a key and depressing it. In my opinion, a physical demonstration of this dialing method would benefit the Court and aid in its construction of the patent."

As this Court has explained in discussing the doctrine of equivalents, "the nature of language makes it impossible to

The District Court, which did not reverse the burden of proof and heighten it, properly concluded that "whether the Nokia phones support the slight endo translation of the thumb as described in the '322 patent is ultimately a question of fact", *Motionless Keyboard Co.,* 2005 WL 1113818, at *25—a ruling which was not appealed. The District Court had expressly rejected Petitioner's attempt, pursuant to Rule 43(e) of the Federal Rules of Civil Procedure, to supplement the photographic evidence by presenting live testimony to demonstrate the use of the accused products, and thereby to show equivalence. (District Court Transcript, Feb. 18, 2005, at 4-5 ("I'm inclined not to need anything demonstrated"). The trier of fact will, of course, have the benefit of such demonstrations.

Ultimately, Petitioner is constrained to regard invention and application of a special, heightened proof rule for equivalents cases as part and parcel of a general hostility to the doctrine of equivalents which has long been noted by this Court in reversing the Court of Appeals.[3] This Court's decision in

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capture the essence of a thing in a patent application", giving rise the very need for the doctrine of equivalents to avoid having the value of patents "greatly diminished". *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 535 U.S. 722, 731 (2002).

[3] This Court noted in *Warner-Jenkinson* that the doctrine of equivalents had been subject to "significant disagreement within the Court of Appeals for the Federal Circuit". *Warner-Jenkinson*, 520 U.S. at 21. This Court again noted the history of hostility toward the doctrine in *Festo*, 535 U.S. at 732 (2002).

Warner-Jenkinson Co. v. Hilton Davis Chemical Co., 520 U.S. 17 (1997), notes ongoing dispute concerning whether judges or juries should rule on questions of infringement under the doctrine of equivalents, but did not resolve the question. *See id.* at 38-39. The Court should not permit the same result to arise through peculiar procedural requirements.

Indeed, this Court has repeatedly rejected the notion that important Constitutional rights of trial by jury may be abridged by erecting heightened evidentiary barriers to be surmounted in the context of summary judgment proceedings. For example, in the context of litigation concerning official immunity under 42 U.S.C. § 1983, this Court rejected a heightened proof standard, noting that it had "consistently declined similar invitations to revise established rules". *Crawford-El v. Britton*, 523 U.S. 574, 595 (1998).

It is for Congress, not the Court of Appeals, to establish heightened proof requirements and special procedural rules to discourage particular classes of claims. *Cf. Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 535 U.S. 722, 733 (2002) (reiterating role of Congress in resolving policy disputes concerning the doctrine of equivalents). This Court should grant the Petition in order to establish that claims for infringement based upon the doctrine of equivalents are subject to the same pleading and proof rules as any other infringement claims, and that no special rules of proof or procedure may be applied to discourage such claims.

Conclusion

For the foregoing reasons, this Court should grant the Petition and either (1) summarily dispose of the case on the first question presented, remanding for rehearing before the Court of Appeals, or (2) set the case for briefing and oral argument on the second question presented.

Respectfully submitted,

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October 26, 2007.

United States Court of Appeals for the Federal Circuit

No. 2005-1497

MOTIONLESS KEYBOARD COMPANY,
Plaintiff-Appellant,
v.
MICROSOFT CORPORATION,
Defendant-Appellee,
and
Nokia Inc.,
Defendant-Appellee,
and
Saitek Industries Ltd.,
Defendant-Appellee.

Decided: May 29, 2007.

Before RADER, DYK, and MOORE, Circuit Judges.

RADER, Circuit Judge.

On summary judgment, the U.S. District Court for the District of Oregon determined that Microsoft Corporation ("Microsoft"); Nokia, Inc. ("Nokia"); and Saitek Industries, Ltd. ("Saitek") did not infringe, literally or under the doctrine of equivalents, Motionless Keyboard Company's ("MKC's") U.S. Patent Nos. 5,178,477 (the '477 patent) and 5,332,322 (the '322 patent). Motionless Keyboard Co. v. Microsoft Corp., No. Civ. 04-180-AA, 2005 WL 1113818 (D. Or. May 6, 2005). Also on summary judgment, the district court determined

that the '477 and '322 patents were invalid based on public use under 35 U.S.C. § 102(b). The district court also found the '322 patent invalid based on obviousness due to the patentee's terminal disclaimer in light of the '477 patent. Because the district court correctly construed the claim limitation "a concavity in said housing at said key actuation position, and a thumb-associable cluster of keys forming a keyboard within said concavity," this court affirms the ruling of no infringement. Because the trial court misapplied the concept of public use and incorrectly found obviousness due to a terminal disclaimer, this court reverses its invalidity rulings.

I

MKC owns the '477 and '322 patents. The '477 patent, entitled "Ergonomic Keyboard Input Device," claims an ergonomic keyboard designed to accommodate the architecture of the human hand. According to the invention, the keyboard requires only slight finger gestures to actuate the keys. '477 Patent Abstract. The '322 patent, entitled "Ergonomic Thumb-Actuable Keyboard for Hand-Grippable Device," issued as a continuation-in-part of the ' 477 patent. This patent claims a hand-held device that frees the thumb to actuate the keys in multiple and differentiated ways. '322 Patent Abstract.

Thomas L. Gambaro is the sole inventor of both the '477 and the '322 patents. Mr. Gambaro invented the novel ergonomic keyboard technology on a part-time basis while also working in other jobs

such as graphic artist and dishwasher. In fact, Mr. Gambaro developed some of the ergonomic keyboard technology while he lived in a friend's attic. As an independent inventor, Mr. Gambaro developed his technology advances without the benefit of a well-funded laboratory and then traversed the patent system on a limited budget.

During his inventive work, Mr. Gambaro developed different prototype models of his keyboard technology. Eventually, on February 22, 1987, Mr. Gambaro developed the Cherry Model 5. Motionless Keyboard, 2005 WL 1113818, at *26. Shortly after developing the Cherry Model 5, Mr. Gambaro entered into a business partnership with Mr. Keith Coulter. Thereafter, Mr. Gambaro and Mr. Coulter set out to gain financial support to further develop and patent the keyboard technology.

Thus, Mr. Gambaro began to demonstrate the Cherry Model 5 to potential investors. He also demonstrated the device to a friend, Ms. Kathie Roberts. While the potential investors signed two-year non-disclosure agreements (NDAs), Ms. Roberts did not. Mr. Gambaro entered into some of the NDAs with potential investors in 1987, meaning those agreements expired in 1989. Id. at *26-27. Additionally, Mr. Gambaro disclosed the Cherry Model 5 to Ms. Sheila Lanier on June 25, 1990 to conduct typing tests. While Mr. Gambaro showed the Cherry Model 5 to his business partner, numerous potential investors, a friend and a typing tester, according to the record, only Ms. Lanier used the

device to transmit data to a computer. In due course, Mr. Gambaro assigned both patents to MKC.

MKC sued Microsoft, Nokia, and Saitek for infringement of the '477 and ' 322 patents in the U.S. District Court for the District of Oregon. Specifically, MKC alleged that Microsoft's "Strategic Commander" game controller infringed claims 1, 2, 5, 6, and 8 of the '477 patent. MKC also alleged that Microsoft's "Sidewinder Precision 2," "Sidewinder Force Feedback 2," and various Saitek game joysticks infringed claims 1, 2, 3 and 5 of the ' 322 patent. MKC alleged that Nokia phone models 3560, 3595, 6200, and 6820 infringed claims 1, 2, 3, and 4 of the '322 patent.

The parties filed cross-motions for summary judgment. MKC moved for summary judgment of infringement against all three defendants. The defendants collectively moved for summary judgment of invalidity of both patents based on public use under 35 U.S.C § 102(b). The District Court entered summary judgment construing the claims of the '477 and '322 patents. Based on its reading of the patents, the trial court found no infringement as a matter of law. In addition, the District Court invalidated the '477 and '322 patents based on public use under 35 U.S.C. § 102(b). The trial court also declared the '322 patent invalid for obviousness in light of a terminal disclaimer.

MKC appeals the invalidity ruling on the '477 patent, but does not appeal the court's claim construction for the '477 patent. MKC appeals the

District Court's claim construction and infringement ruling on the '322 patent. MKC also appeals the court's invalidity rulings on the '322 patent. This court has jurisdiction under 28 U.S.C. § 1291(a)(1).

II

This court reviews a district court's grant of summary judgment without deference drawing all justifiable inferences in favor of the nonmovant. Genentech, Inc. v. Amgen, Inc., 289 F.3d 761, 767 (Fed.Cir.2002). Claim construction is a matter of law that this court reviews without deference. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1456 (Fed.Cir.1998) (en banc); Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed.Cir.1995), aff'd, 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). The meaning of the statutory terms "on sale" or "public use" within section 35 U.S.C. § 102(b) is a question of law that this court reviews without deference. Envirotech Corp. v. Westech Eng'g Inc., 904 F.2d 1571, 1574 (Fed.Cir.1990); Moleculon Research Corp. v. CBS, Inc., 793 F.2d 1261, 1266 (Fed.Cir.1986). In reviewing summary judgment rulings on infringement and invalidity, this court "need[s] to determine de novo whether the evidence in the record raises *1380 any genuine disputes about material facts. An evidentiary dispute is genuine if a jury could decide the issue either way, and its verdict would survive a motion for judgment as a matter of law." General Elec. Co. v. Nintendo Co., Ltd., 179 F.3d 1350, 1353 (Fed.Cir.1999).

III

The district court's determination of no infringement of the '322 patent rested on claim construction. Claim 1 of the '322 patent is the only independent claim and all the asserted claims contain the limitations of claim 1. Claim 1 of the '322 patent shows the pertinent limitation in the context of the entire claim:

> 1. A hand-held device for entering information into an electronic system via a keyboard, the device comprising:
>
> a housing having a grippable portion which permits the device to be held in one hand with the thumb free to move at least temporarily to a predetermined key-actuation position while the device is held,
>
> a concavity in said housing at said key-actuation position, and
>
> a thumb-associable cluster of keys forming a keyboard within said concavity, each of the plurality of keys in said cluster being selectively actuable via mixed lateral and slight endo, translation of a thumb within said concavity, whereby information is entered into an electronic system.

'322 Patent col.8 ll.16-31 (emphases added). The district court construed "a concavity in said housing at said key-actuation position, and a thumb-associable cluster of keys forming a keyboard within said concavity" to mean "that the concavity must be

formed by a depression in the housing of the device, and that all keys comprising the keyboard must be contained entirely within the concave area and sunk below the surface of the housing, so that the thumb movement occurs within the concave area." Motionless Keyboard, 2005 WL 1113818, at *19.

On appeal, MKC argues that "a concavity in said housing at said key-actuation position, and a thumb-associable cluster of keys forming a keyboard within said concavity" means that the tops of the keys themselves can form the concavity. Thus, under MKC's proposed construction of the claims, the keys or portions thereof themselves can form a concavity within the housing. MKC wants a broad construction of the concavity. Appellees, to the contrary, agree with the district court's narrower construction.

The claim language "a concavity in said housing at said key-actuation position, and a thumb-associable cluster of keys forming a keyboard within said concavity " defines well the limitation. '322 Patent col.8 ll.21-23 (emphases added). By using the terms "concavity in said housing" and "keyboard within said concavity," the patentee defined a depression within the housing of the device and set the keyboard entirely within that depression. The district court correctly grasped and conveyed this meaning.

The specification underscores the correctness of the trial court's construction: a "keyboard is positioned in a concavity or depression in the housing." '322 Patent col.4 ll.58-59 (emphasis added).

To confirm this reading, all keyboard renderings in Figures 1, 3-5, 7, and 8 in the '322 patent show a concavity in the housing of the device with the keyboard totally within the concavity. '322 Patent Fig. 1, 3-5, 7, and 8. Figure 4, for instance, shows the concavity:

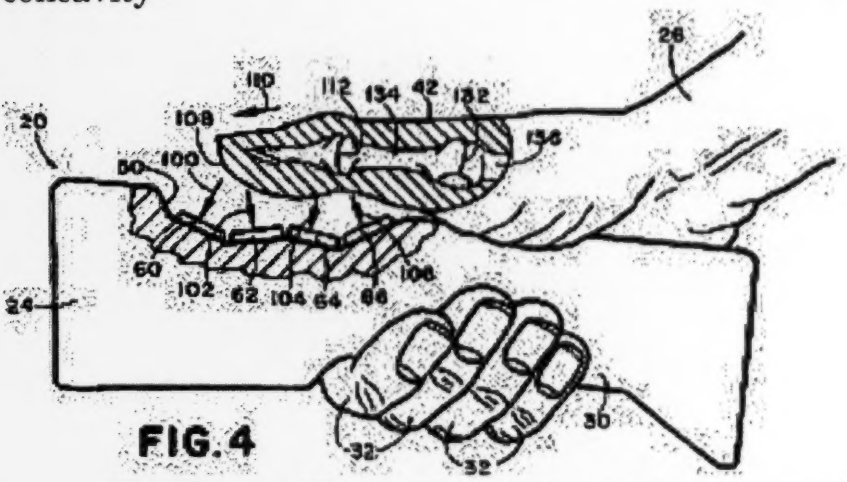


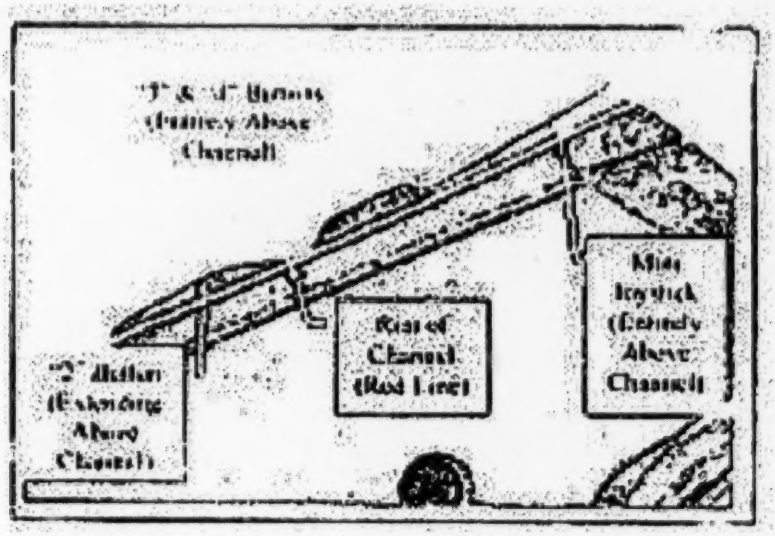
FIG. 4

'322 Patent Fig. 4. Thus, this court agrees with the district court's claim construction of this limitation.

With respect to the infringement analysis, the accused Microsoft Sidewinder joysticks, the Saitek joysticks, and the Nokia cellular phones do not literally infringe the '322 patent because the joysticks and cellular phones lack a concavity in the housing and a keyboard within the cavity. The Microsoft joysticks do not contain a concavity in a housing as shown by the side view of the top portion of a Sidewinder joystick. The Microsoft joysticks do not contain a concavity as construed as a depression in the housing. Furthermore and in addition to the lack of a concavity, the keys of the Microsoft joysticks extend beyond the limits of the devices (see figure

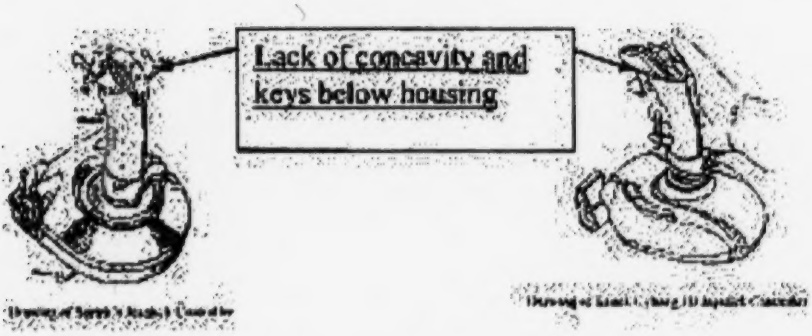
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below) and therefore the keys are not contained entirely within a concave area and thereby sunk below the surface of the housing.



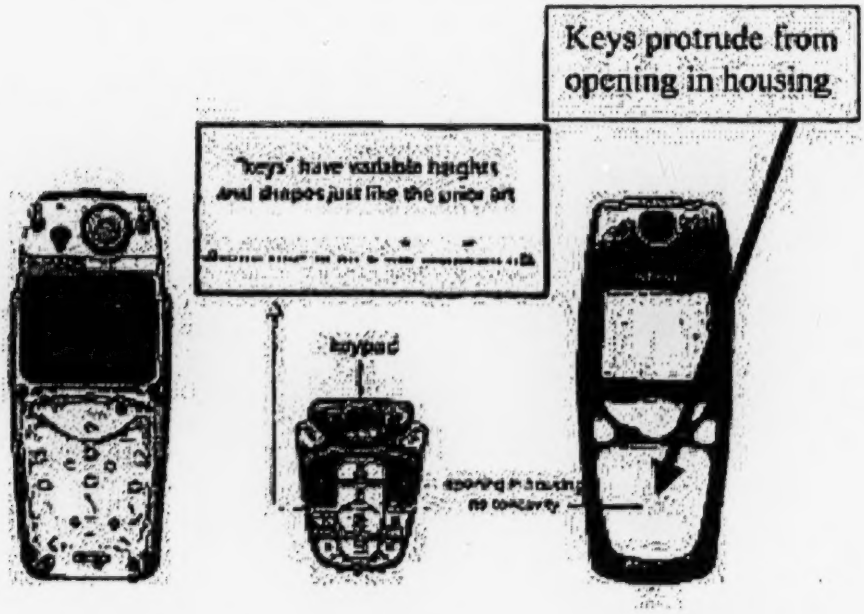
Therefore, the district court properly found summary judgment of no literal infringement.

Similar to the Microsoft joysticks, the Saitek joysticks contain neither a concavity in a housing nor keys contained entirely within a concave area and thereby sunk below the surface of the housing. An example of two Saitek joysticks shows a lack of a concavity and a lack of keys sunk completely within the concavity and below the housing.



Therefore, as with the Microsoft joysticks, the district court properly found summary judgment of no literal infringement.

The accused Nokia phones have keys that are placed onto a flat surface with the keys protruding through an opening in the housing of each phone. While some of the phones contain keys with slight depressions, these keys do not constitute a concavity in the housing according to the '322 patent. The following picture of an accused phone shows no concavity within the housing. In fact, the keys protrude through an opening in the housing.



Thus, because there were no genuine issues of material fact as to any of the Microsoft, Saitek or Nokia products, the district court properly found summary judgment of no literal infringement.

As for infringement under the doctrine of equivalents, MKC only presented the district court with conclusory statements about equivalents. Motionless Keyboard, 2005 WL 1113818, at *13, *24. To avoid a grant of summary judgment of non-infringement by equivalents, the patentee must present "particularized evidence and linking argument as to the 'insubstantiality of the differences' between the claimed invention and the accused device, or with respect to the 'function, way, result' test." *1383 PC Connector Solutions LLC v. SmartDisk Corp., 406 F.3d 1359, 1364 (Fed.Cir.2005) (citing Texas Instruments Inc. v. Cypress

Semiconductor Corp., 90 F.3d 1558, 1567 (Fed.Cir.1996)). Thus, the patentee has the burden to present particularized evidence that links the accused products to the patent on a limitation by limitation basis. General Elec. v. Nintendo Co., 179 F.3d 1350, 1359 n. 5 (Fed.Cir.1999).

With respect to the accused joysticks, MKC contends that the patents, the joysticks, and the claim charts show substantial similarities of form, function, and result. Based on only the information in the claim charts, MKC contends that inputting data with the hand-held controller with the thumb translates to infringement under the doctrine of equivalents. However, as the district court properly noted, "[MKC] presents no evidence that the differences between the joysticks and the claimed elements are insubstantial, or that the joysticks perform 'substantially the same function in substantially the same way to obtain the same result.' " Motionless Keyboard, 2005 WL 1113818, at *21 (citing Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 39, 117 S.Ct. 1040, 137 L.Ed.2d 146 (1997)). Because MKC did not provide any particularized testimony to show infringement under the doctrine of equivalents, this court does not need determine the applicability of the limitations on the doctrine of equivalents.

Similarly with the Nokia cellular phones, MKC does not provide any evidence that the accused phones perform substantially the same function in substantially the same way to obtain the same result. The keys on the Nokia phones do not permit

thumb movement to actuate the keys within the concavity. While the patentee's invention points to actuation of the keys by thumb movement within the concavity, a user would actuate the Nokia keys by pressing them downward. In other words, the invention and the Nokia phone actuate the keys in different ways. As MKC did not provide any particularized testimony to specifically show that the keys work in the same way, the trial court properly granted summary judgment of non-infringement under the doctrine of equivalents.

IV

MKC appeals the district court grant of summary judgment that the '477 and ' 322 patents are invalid for public use under 35 U.S.C. § 102(b):

> A person shall be entitled to a patent unless-
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States.

35 U.S.C. § 102(b) (emphasis added). Because the applicant filed the ' 477 patent on June 6, 1991, the critical date for the invalidity analysis is June 6, 1990. The critical date for the '322 patent is January 11, 1992. To sustain the invalidity determination, the record must show that an embodiment of the patented invention was in public use as defined by the statute before the critical date.

The district court found that MKC admitted that the Cherry Model 5 embodied the '477 patent and the '322 patent as of February 22, 1987. Even assuming that MKC admitted that the Cherry Model 5 embodied each claim of the '477 and '322 patents-a question this court need not decide-this court concludes that there was no "public use" under 35 U.S.C. § 102(b). Therefore, the district court's grant of summary judgment of invalidity for public use was improper.

The record shows that the inventor disclosed the Cherry Model 5 to his business partner, potential investors, a friend, and a typing tester before the critical date. While the potential investors signed NDAs, some of the NDAs expired in 1989-again prior to the critical dates for each patent. Thus, this court must examine, in the context of the district court's summary judgment ruling of invalidity, whether these disclosures and demonstrations were public uses within the meaning of the statutory bar.

Public use includes "any [public] use of [the claimed] invention by a person other than the inventor who is under no limitation, restriction or obligation of secrecy to the inventor." In re Smith, 714 F.2d 1127, 1134 (Fed.Cir.1983) (citing Egbert v. Lippmann, 104 U.S. 333, 336, 26 L.Ed. 755 (1881)). In Pfaff v. Wells Elecs., Inc., the Supreme Court noted that both the "on sale" and "public use" bars were based on the same policy considerations. Pfaff v. Wells Elecs., Inc., 525 U.S. 55, 64, 119 S.Ct. 304, 142 L.Ed.2d 261 (1998). Specifically, "[t]he [Supreme]

Court noted that both the on sale and public use bars of § 102(b) stem from the same 'reluctance to allow an inventor to remove existing knowledge from public use.' " Invitrogen Corp. v. Biocrest Mfg., L.P., 424 F.3d 1374, 1379 (Fed.Cir.2005) (internal quote from Pfaff, 525 U.S. at 64, 119 S.Ct. 304).

The district court found that Mr. Gambaro had disclosed the Cherry Model 5 to potential investors in order to obtain capital. As such, the district court reasoned that these disclosures showed the invention entered the public domain prior to the critical date because Mr. Gambaro's business partner was under no obligation to keep the Cherry Model 5 secret. Motionless Keyboard, 2005 WL 1113818, at *28. Further, the disclosures to potential investors showed that Mr. Gambaro attempted to obtain capital to develop his invention. Id. The district court found the NDAs inconsequential because "a confidentiality agreement will not preclude application of the public use doctrine, if the device was disclosed for commercial purposes." Id. (citing Kinzenbaw v. Deere & Co., 741 F.2d 383, 390 (Fed.Cir.1984)). MKC admits to a series of limited disclosures to potential investors to raise capital to develop the invention and prosecute the patent application. However, MKC further contends that the disclosures did not involve the Cherry Model 5 or its use as claimed in the '477 or '322 patents.

"The classical standard for assessing the public nature of a use was established in [Egbert v. Lippman, 104 U.S. 333, 26 L.Ed. 755 (1881)]. In Egbert, the inventor of a corset spring gave two

samples of the invention to a lady friend, who used them for more than two years before the inventor applied for a patent." Invitrogen, 424 F.3d at 1382. Although the inventor in Egbert did not obtain any commercial advantage, the Court determined that the invention had been used for its intended purpose for over a decade without limitation or confidentiality requirements. Thus, even though not in public view, the invention was in public use. Id. In Electric Storage Battery Co. v. Shimadzu, 307 U.S. 5, 59 S.Ct. 675, 83 L.Ed. 1071 (1939), the Court found "the ordinary use of a machine or the practice of a process in a factory in the usual course of producing articles for commercial purposes is a public use." Id. at 20, 59 S.Ct. 675. On the other hand, in TP Laboratories, Inc. v. Professional Positioners, Inc., 724 F.2d 965 (Fed.Cir.1984), this court found that premature installation of an inventive orthodontic appliance in several patients without a written confidentiality agreement was not a public use due to the expectation of confidentiality inherent in the dentist-patient relationship. This case again presents the question of the meaning of public use under 35 U.S.C. § 102(b).

In this case, Mr. Gambaro disclosed his Cherry Model 5 to his business partner, a friend, potential investors, and a typing tester (Ms. Lanier). In all these disclosures, except in the case of Ms. Lanier, however, the Cherry Model 5 was not connected to a computer or any other device. In the case of Ms. Lanier, the Cherry Model 5 was used to conduct typing tests on July 25, 1990, and thereby connected to a computer for its intended purpose. With respect

to the '477 patent, the typing test occurred after the critical date of June 6, 1990. With respect to the '322 patent, Ms. Lanier appears to have performed a one-time typing test to assess typing speed. The typing test by Ms. Lanier was allegedly performed on July 25, 1990 and, according to a synopsis of NDAs in the record, Ms. Lanier signed an NDA on the same day. The critical date for the '322 patent is January 11, 1992. In this case, the one time typing test coupled with a signed NDA and no record of continued use of the Cherry Model 5 by Ms. Lanier after July 25, 1990 did not elevate to the level of public use. Thus, the Cherry Model 5 was never in public use. All disclosures, except for the one-time typing test, only provided a visual view of the new keyboard design without any disclosure of the Cherry Model 5's ability to translate finger movements into actuation of keys to transmit data. In essence, these disclosures visually displayed the keyboard design without putting it into use. In short, the Cherry Model 5 was not in public use as the term is used in section 102(b) because the device, although visually disclosed and only tested one time with a NDA signed by the typing tester, was never connected to be used in the normal course of business to enter data into a system.

Unlike the situations in Egbert and Electric Storage Battery, where the inventions were used for their intended purpose, neither the inventor nor anyone else ever used the Cherry Model 5 to transmit data in the normal course of business. The entry of data did not ever occur outside of testing and the tester signed an NDA. The Cherry Model 5 was

not used in public, for its intended purpose, nor was the Cherry Model 5 ever given to anyone for such public use. Thus, the disclosures in this record do not rise to the level of public use.

On another issue, the district court determined that Mr. Gambaro had admitted that the '322 patent was invalid for obviousness by filing a terminal disclaimer to make the '322 coterminous with the '477 patent. The district court reasoned that this filing conceded that the '322 patent was obvious in light of the '477 patent. Motionless Keyboard, 2005 WL 1113818, at *29. A terminal disclaimer simply is not an admission that a later-filed invention is obvious. Quad Envtl. Tech. Corp. v. Union Sanitary Dist., 946 F.2d 870, 874 (Fed.Cir.1991). Thus, the trial court erred on this point and the '322 patent is not invalid due to obviousness.

V

This court affirms the district court's claim construction and the summary judgment of no infringement. However, this court reverses the district court's summary judgment ruling of invalidity of the '477 and '322 patents. This court also reverses the district court's finding that the '322 patent is invalid for obviousness due to patentee's terminal disclaimer.

COSTS

Each party shall bear its own costs.

AFFIRMED-IN-PART and REVERSED-IN-PART.

NOTE: This order is nonprecedential.

United States Court of Appeals for the Federal Circuit

2005-1497

MOTIONLESS KEYBOARD COMPANY,

Plaintiff-Appellant,

MICROSOFT CORPORATION,

Defendant-Appellee,

and

NOKIA INC.,

Defendant-Appellee,

and

SAITEK INDUSTRIES LTD.,

Defendant-Appellee.

ON MOTION

Before RADAR, DYK, and MOORE, Circuit Judges.

PER CURIAM

ORDER

Nokia, Inc. and Saitek Industries move for a 30 day extension of time to seek panel rehearing or rehearing en banc. Motionless Keyboard Company moves for a 30 day extension of time to file a petition for panel rehearing.

Upon consideration thereof,

IT IS ORDERED THAT:

The motions are denied.

FOR THE COURT

June 14, 2007
Date

Jan Horbaly
Clerk

Cc: James L. Buchal, Esq.
J. Christopher Carraway, Esq.
Lawrence D. Rosenberg, Esq.
Joseph W. Price, Esq.

No. 05-1497

United States Court of Appeals
for the Federal Circuit

MOTIONLESS KEYBOARD COMPANY,
Plaintiff-Appellant,

v.

MICROSOFT CORPORATION,
Defendant-Appellee,

and

NOKIA INC.,
Defendant-Appellee,

and

SAITEK INDUSTRIES LTD.,
Defendant-Appellee.

Appeal from the United States District Court
for the District of Oregon in Case No. 04-CV-180,
Judge Ann L. Aiken

DECLARATION OF JAMES L. BUCHAL IN SUPPORT OF MOTION FOR EXTENSION OF TIME

James L. Buchal
Murphy & Buchal LLP
2000 SW First Ave., Ste. 320
Portland, OR 97201
Phone: 503-227-1011

James L. Buchal, being duly sworn, deposes and says:

1. I am counsel to plaintiff in this action. I make this declaration in support of Motionless Keyboard Company's (hereafter "MKC") motion for an extension of time in which to file its petition for rehearing of the panel opinion issued May 29, 2007.

2. Good cause exists for this motion because the inventor and principal client contact for MKC, Mr. Gambaro, was involved in an apartment fire in May that has caused him to suffer eviction proceedings; he has had to move to new lodgings; and as a result has not been able adequately to consider the options of Motionless in the wake of the panel opinion.

3. In addition to considering a petition for rehearing, Motionless has also received proposals from certain defendants concerning possible

settlement. Motionless requires additional time to make informed choices concerning these patents and the infringement claims.

I certify under penalty of perjury that the foregoing is true and correct.

Executed on June 12, 2007.

MURPHY & BUCHAL LLP

_____

James L. Buchal, OSB #92161

United States Patent **Patent Number: 5,332,322**
Gambaro **Date of Patent: Jul. 26, 1994**

ERGONOMIC THUMB-ACTUABLE KEYBOARD FOR A HAND-GRIPPABLE DEVICE

Inventor: Thomas L. Gambaro, 3231 SE. 36th Ave., Portland, Oreg. 97202

Notice: The protion of the term of this patent subsequent to Jan. 12, 2010 has been disclaimed.

Appl. No.: 3,118

Filed: Jan. 11, 1993

Related U.S. Application Data

Continuation-in-part of Ser. No. 711,760, filed Jun. 6, 1991, Pat. No. 5,178,477.

Int. Cl.[5].....B41J 5/14; H04M 7/00
U.S. Cl......400/489; 379/433
Field of Search.....400/489,88; 364/709.15, 709.16, 705.05; 379/433, 368, 434, 440

References Cited

U.S PATENT DOCUMENTS

D285.200	8/1986	Bressler et al.....379/434
2,369,807	2/1945	Solon.....400/489
4,020,527	5/1977	O'Neill.....400/88

4,244,659	1/1981	Malt	400/489
4,332,493	6/1982	Einbinder	400/486
4,579,470	4/1986	Casey	400/489
4,597,681	7/1986	Hodges	400/488
4,824,268	4/1989	Diernisse	400/486
4,849,732	7/1989	Dolenc	400/489
4,913,573	4/1990	Retter	400/489

FOREIGN PATENT DOCUMENTS

2725677 12/1977 Fed. Rep. of Germany.....400/489

OTHER PUBLICATIONS

Kennedy, "Hand-Held Data Input Device", IBM Technical Disclosure Bulletin, vol. 26, No. 11, Apr. 1984.

Harris Corp, "Model TS-22", Telephony, May 11, 1987, p. 97.

Telecommunication article from technical journal, publication and date unknown.

IBM Technical Disclosure, vol. 25, No. 9, Feb. 1983, A. Uchiyama, Kana Keyboard with Palm Rest, British Printer, Sep. 1977.

Primary Examiner: Edgar S. Burr
Assistant Examiner: Anthony H. Nguyen
Attorney, Agent or Firm: Kolisch Hartwell Dickinson McCormack & Heuser

Abstract

A hand-held thumb-actuated ergonomic keyboard input device for use with a coupled electronic system

such as a selector on a portable telephone. The device includes a housing which incorporates a hand-grippable portion that permits the device to be held in one hand with the thumb free to move at least temporarily to a predetermined key-actuation position. In other words, the grippable portion allows the device to be securely held with the fingers and with the thumb-free. A keyboard cluster is provided on the device in a concavity in the housing. The keyboard is located at the predetermined thumb-accessible key-actuation position and includes a key arrangement which allows the thumb to selectively actuate individual keys. Only slight gestural movements of the thumb are required to actuate individual keys on the keyboard. The gestural movements include mixed lateral and endo translation of the thumb within the keyboard concavity. The keyboard is particularly useful on devices such as portable telephones where two-hand actuation is sometimes difficult.

5 Claims, 6 Drawing Sheets

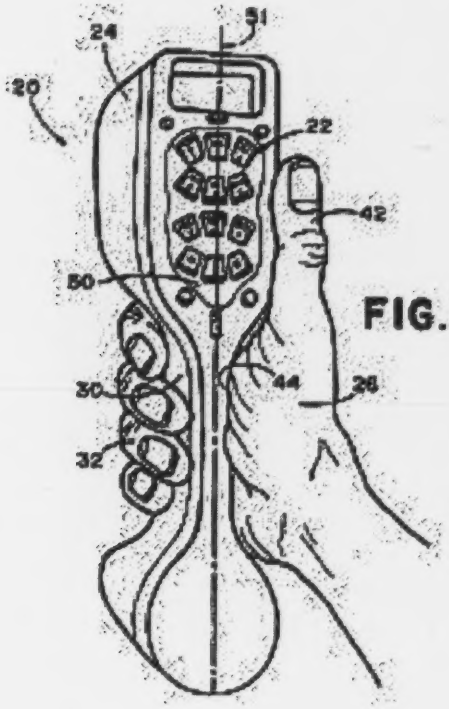


FIG. 1

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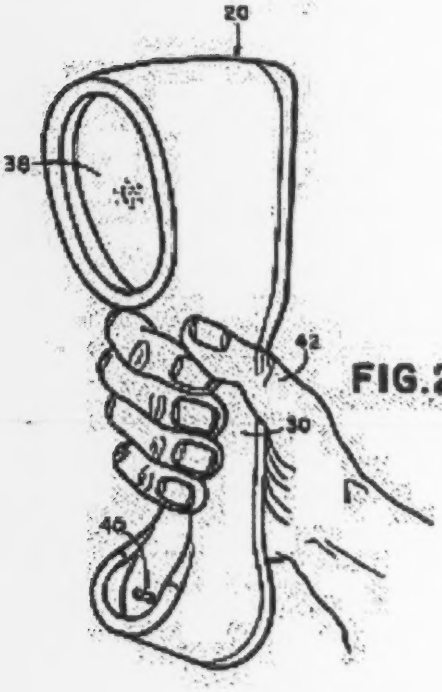


FIG.2

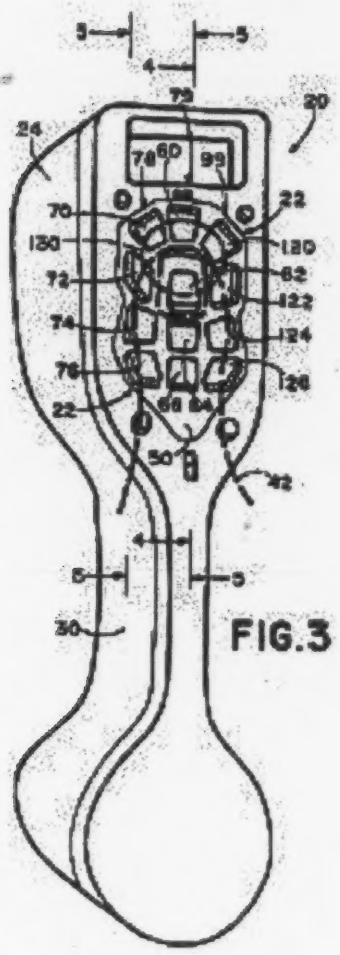

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30

FIG.3

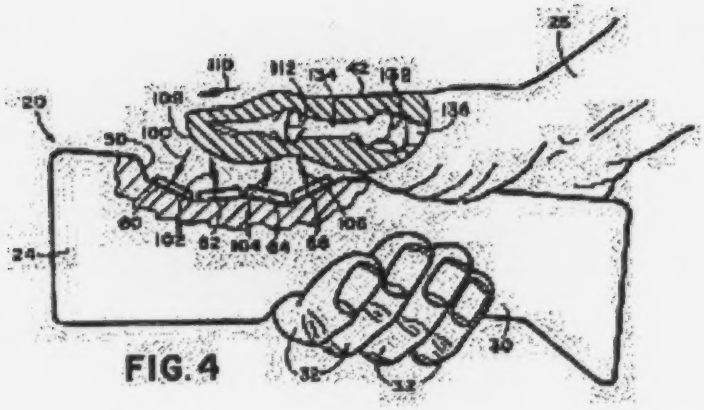


FIG. 4

U.S. Patent

U.S. Patent

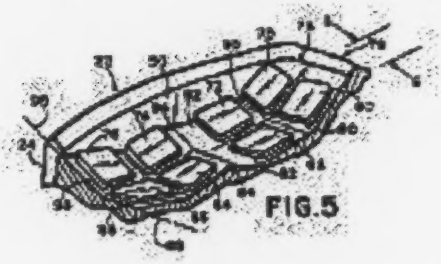


FIG. 5

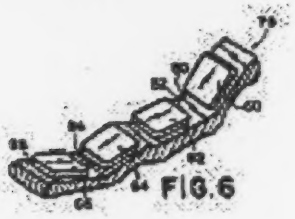


FIG. 6



FIG.7

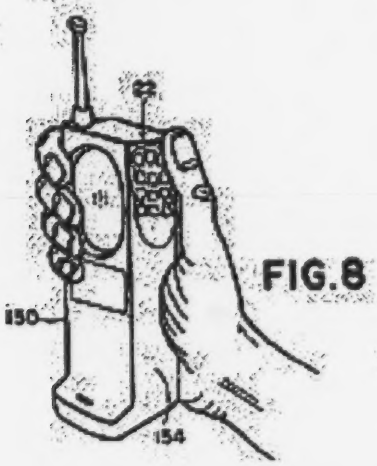


FIG.8

ERGONOMIC THUMB-ACTUABLE KEYBOARD FOR A HAND-GRIPPABLE DEVICE

CROSS REFERENCE TO RELATED APPLICATION

This is a continuation in part of application Ser.No. 07/711,760, filed Jun. 6, 1991, entitled ERGONOMIC KEYBOARD INPUT DEVICE."

Which will issue as United States Letters Patent No. 5,178,477 on Jan. 12, 1993.

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention relates to a keyboard input device for transmitting information to a suitably coupled electronic system, such as a telephonic switching system or a digital computer. More particularly, it relates to such a device wherein the keyboard is specially ergonomically designed with reference to the architecture of the human hand in such fashion that, at least with respect to the thumb on the hand, only slight gestural motion is required for effective, multiple, differentiated key actuation.

Electronic devices continue to be developed which incorporate keyboards or keypads for information entry into an electronic system. Hand-held devices, particularly devices designed to be gripped and held in one hand, are made for a variety of tasks. A portable telephone, such as a cellular telephone, is an example of a hand-held device designed to be gripped and held in one hand and which includes a keyboard information entry system. Because portable telephones are sometimes used by a person engaged in an activity which requires more or less continuous use of the hand which is not holding the telephone, such as driving a car, the ability to both grip a portable telephone and operate its keyboard with a single hand would be useful. Since the user's fingers are customarily employed in

gripping the telephone, it would be particularly helpful if a keyboard could be provided which is operable by the user's thumb.

Recent advancements in the development of finger-associable key clusters have helped achieve a better understanding of how keys can be arranged to confront, in an advantageous way, the skeletal architecture of the hand. In the parent application of which this application is a continuation-in-part, namely, applicant Ser. No. 07/771,760, filed Jun. 6, 1991, entitled ERGONOMIC KEYBOARD INPUT DEVICE, which will issue as U.S. Pat. No. 5,178,477, the specification of which is incorporated herein by reference, I have described my new ergonomic keyboard input device which incorporates finger-associable key clusters. The problem addressed by my invention has lead to the development of a new generation of ergonomic keyboard input devices, of which the present invention is one example.

In recent past years, there has been a dynamic and explosive growth in the use of keyboard devices. This growth, as many know, has been driven largely by the proliferation and ready availability of computer systems for substantially all arenas of society, ranging from business to individual settings. Accompanying this explosion, unhappily for those who spend many hours using such devices, are various annoying and debilitating muscular syndromes that result from repetitive, fatiguing hand, wrist and finger motions that are required in the use of the ubiquitous, conventional typewriter-like keyboards. These syndromes translate not only

into pain and discomfort for the affected users, but also into significant loss of productivity--clearly two problems to which corrective attention should be given.

Attention to this problem, generally, is not new in the art, as is evidenced by many serious attempts to alleviate keyboard-use "injuries" through innovative keyboard layouts and architectural designs. Two very good illustrations of approaches taken in the prior art are illustrated in U.S. Pat. Nos. 4,332,493 to Einbinder, and 4,849,732 to Dolenc.

The Einbinder patent discloses a typewriter keyboard in which, not only are keys laid out in a fashion relating to what might be though of as the "footprint" of the human hand, but also the proposed keys are designed with topographically height- and angle-differentiated actuation pads that tend to minimize, somewhat, overall hand and finger motion during use. However, the Einbinder system still focuses significant attention on the importance of having so-called "home positions" for the finger and thumb tips, from which positions the fingers (and therefore the hands) must travel appreciably in order to perform the usual kinds of typing operations. Thus, the Einbinder approach steps toward, but closes only a portion of the gap in, solving the motion difficulties encountered with conventional keyboards. Put another way, Einbinder does not substantially eliminate these difficulties.

The Dolenc patent illustrates and describes a one-hand key shell which includes fan-like arrays of plural keys distributed in elongate rows and organized for specific actuation by the thumb and four fingers of a hand. Angular and topographical distinctions for individual keys, such as those shown in the Einbinder patent, are not present in the Dolenc system. Dolenc also, apparently, does not establish a "home position" for the tips of the fingers and thumb. Dolenc is concerned with minimizing hand motion, but not particularly finger motion. In fact, Dolenc speaks in terms of organizing keys in the arrays in such a fashion that they take into account the "motion and range of the respective fingers of the hand." Thus, Dolenc clearly contemplates fingertip actuation of each key, and reinforces this concept by teaching that a full equivalent of the push-button keys which he illustrates could take the form of a series of flat-panel touch pads. Accordingly, while Dolenc seriously addresses the issue of minimizing hand motion, his system does not appreciably contribute to minimizing finger motion (and hence related wrist motion).

There are other patents of which I am aware that address, to different degrees, modified keyboard arrangements. These include U.S. Pat. Nos. 2,369,807 to Solon, 4,244,659 to Malt, 4,579,470 to Casey, 4,597,681 to Hodges, and 4,824,268 to Diernisse H.V. None of these latter-mentioned five patents appears to address, at least as pointedly as Einbinder and Dolenc, the issues of keyboard motion "injuries."

In addressing the problems associated with repetitive finger motion I have also developed an ergonomic keyboard configuration which addresses the problem of providing a thumb-actuable keyboard on a hand-grippable device such as a portable telephone. Since there is a need for thumb-actuable keyboards on electronic instruments such as telephones, it is an object of the present invention to provide such a keyboard input device which allows a user to input numbers or other information into the device using only the thumb, thereby allowing the rest of the digits on the user's hand to be employed in gripping the device.

Another object of the invention is to provide a thumb-actuable key cluster on a keyboard which minimizes the motion required of the thumb to input information via actuation of the keys.

Still another object of the invention is to provide a thumb-actuable key cluster which is readily usable, by temporary movement of the thumb, to a key-actuation position on the device without having to release the user's grip on the device.

Accordingly, a hand-held device is provided for entering information into an electronic system via a keyboard. The device comprises a housing having a grippable portion which permits the device to be held in one hand with the thumb free to move at least temporarily to a predetermined key-actuation position while the device is held. The unique architecture of the device includes a concavity

formed in the housing at the aforementioned key-actuation position. A thumb-associable cluster of keys forms a keyboard within the concavity. The keys are selectably actuable via mixed lateral, and slight endo, translation of a thumb within the concavity, whereby information is entered into the electronic system.

In its preferred form, the concavity on the housing of the device contains a plurality of keys which are located within a cone of motion of the user's thumb whose apex resides adjacent the base of the thumb. Individual keys in the cluster of keys are oriented in planes which are angularly offset from one another to permit selective actuation by minimal movement of a thumb positioned in the concavity.

These and other objects attained, and advantages offered, by the present invention will become more fully apparent as the description that now follows is read in conjunction with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a hand-held portable telephone in accordance with the present invention with the thumb of the user's hand moved to a position adjacent the keyboard of the device.

FIG. 2 is a perspective view of the portable telephone of FIG. 1, rotated in orientation, showing the device when it is gripped by the user with the thumb moved away from the keyboard of the device.

FIG. 3 is an enlarged perspective view of the portable telephone of FIGS. 1 and 2 illustrating (in phantom) the approximate location of the user's thumb when in its key-actuation position.

FIG. 4 is a side view of the portable telephone and hand shown in FIGS. 1 and 2, in partial cross section taken along lines 4--4 of FIG. 3, illustrating the position of the user's thumb when just above the key-actuation position.

FIG. 5 is a partial, schematic, partially cross-sectional perspective view of a portion of the keyboard on the telephone of FIGS. 1-4 taken approximately between lines 5--5 of FIG. 3.

FIG. 6 is a partial perspective partially cross-sectional view taken between lines 6--6 of FIG. 5 showing the central column of keys in the cluster of keys and illustrating the angular offset between the support planes of individual keys.

FIG. 7 is a perspective view as in FIG. 1 showing an alternative embodiment of a hand-held device incorporating the present invention.

FIG. 8 is another alternative embodiment of the portable telephone of FIG. 1.

DETAILED DESCRIPTION AND BEST MODE FOR CARRYING OUT THE INVENTION

Turning attention now to the drawings and referring first to FIG. 1, there is indicated generally at 20 a hand-held device, namely, a portable

telephone, which incorporates my invention. The device 20 includes a keyboard 22 for transmitting information supplied by a human operator (user) to a suitable electronic system (not shown) such as the internal components within device 20, which are in turn coupled via a broadcast or wire connection to external devices (not shown). The coupling arrangement between keyboard 22 and a suitable electronic system is very well know to those skilled in the art and forms no part of the present invention. Hence, it is omitted from the drawings and from any further discussion.

The portable telephonic device 20 has an exterior housing 24 which is shaped or contoured to include at least a portion which is easily and securely held in the hand 26 of a user. In particular, the housing 24 includes a grippable portion 30 which is a part of the housing and is capable of being held in one hand with the user's fingers 32 partially wrapped around the grippable portion.

Keyboard 22 is provided on what may be thought of as the back side of the telephone, i.e., the side opposite to that which is held adjacent the user's mouth and ear when the telephone is used for conversational communication. FIG. 2 illustrates in perspective the front side of portable telephone 20 and shows the user's hand gripping the grippable portion 30 in a manner typically used when speaking into the telephone. The telephone includes an earpiece 38 for holding adjacent the user's ear and a mouthpiece 40 for holding adjacent the mouth when the phone is in use, as is very well known.

Grippable portion 30 of the housing 24 is preferably sized to allow the user's fingers to partially encircle the grippable portion and press it into the palm of hand 26. In particular, the size and shape of the grippable portion of the telephone should permit the user to grip and hold the device in the palm of the hand without use of the thumb 42. Instead, the fingers will press the grippable portion between the fingers and the "ball" of the thumb 44 (the "ball" being otherwise known as the thenar eminence). When device 20 is held in that manner, the thumb is free to move, at least temporarily, to a predetermined key-actuation position overlying keyboard 22 without losing an effective hold on the device. In other words, the user's thumb 42 can be moved freely between the position shown in FIGS. 1 and 2, or to an intermediate position for actuating the keyboard, while the user maintains a firm grip on the device.

Turning next to FIG. 3, wherein the backside of the portable telephone device 20 is illustrated on an enlarged scale, keyboard 22 is positioned in a concavity or depression 50 in housing 24. The concavity 50 is located for convenient key-actuation by the user's thumb, which is shown in phantom at 42. The position of thumb 42 in FIG. 3 is referred to as the predetermined key-actuation position in which the thumb is in operational contact with the keyboard 22.

Keyboard 22 within concavity 50 is a thumb-associable cluster of depressible keys. Each of the

keys is selectively actuable via movement along an axis of motion generally perpendicular to the support plane of the key. In other words, each key is actuated by depressing the key. The illustration of the keys in FIG. 3 is somewhat schematic with respect to the support planes of the keys. The individual keys in keyboard 22 are oriented in planes which are angularly offset from one another in a unique arrangement which allows for selective actuation by the thumb with a minimum of motion, referred to in the parent application as "gestural" motion, as will be described below.

Turning next to FIG. 4, which is a partially cross-sectional view of telephone 20 taken generally down the center longitudinal axis 51 of the telephone (see FIG. 1), the user's hand and thumb are illustrated with thumb positioned just above its key-actuation position. The concavity 50 in which the keys are positioned is illustrated in FIG. 4 with the central column of keys 60, 62, 64, 66 (which extend along axis 51) also illustrated. As noted above, the keys are oriented in planes which are angularly offset from one another.

Turning attention now to FIG. 5, two columns of keys on the keyboard 22 are illustrated with all but the immediately adjacent parts of the housing cut away. Housing 50 is preferably formed of a suitable lightweight molded plastic material. Each of the keys herein is conventional in construction and takes the form of a momentary push button. Electrical connections to the keys have been omitted because they are conventional and form no part of

the present invention. What is of importance is the angular orientation and placement of the individual keys in concavity 50, which will now be described. The leftmost longitudinal column of keys (as illustrated in FIG. 3) 70, 72, 74, 76, and the previously-identified central longitudinal column 79 of keys 60, 62, 64, 66 are depicted in FIG. 5 within a partial cross-sectional slice of concavity 50.

Keys 60, 62, 64, 66, 70, 72, 74, 76 each lie on planar surfaces which are formed in concavity 50. Four of the planar surfaces support the central column 79 of keys 60, 62, 64, 66, the surfaces being shown separately at 80, 82, 84, 86, respectively, in FIG. 6. These planes intersect one another in a mixed pattern of obtuse and reflex angles according to the invention, and in this respect, planes 80, 82 intersect one another at an obtuse angle of about 105-degrees, planes 82, 84 at a reflex angle of about 210-degrees, and planes 84, 86 at an obtuse angle of about 150-degrees. As can be seen, there is a slight step which is formed between planes 82, 84. A similar relationship exists between the support planes 90, 92, 94, 96 for keys 70, 72, 74, 76, respectively (see FIG. 5). Namely, planes 90, 92 intersect one another at an obtuse angle of about 105-degrees, planes 92, 94 at a reflex angle of about 210-degrees, and planes 94, 96 at an obtuse angle of about 150-degrees. There is a slight step which is formed between planes 92, 94.

The entire left column of keys 70, 72, 74, 76 is angled downwardly into concavity 50, toward the central keys 60, 62, 64, 66. The angular offset

between the rows of keys can in part be visualized and described by noting the angle of the plane 96 of key 76 with respect to a horizontal reference line 88, which represents the angle of the plane 86 of key 66. Line 98 and plane 96 meet line 88 and plane 86 at an obtuse angle of about 120-degrees.

The angular dispositions just described between the support planar surfaces for the keys in columns 78 and 79 have been selected herein, as will be explained, to take advantage of the underside architecture of the skin and bone structure in a user's thumb. Keyboard 22 also includes a third column of keys, i.e., the rightmost column generally parallel with columns 78 and 79. Rightmost column 99 is omitted from FIG. 5 for clarity but is a mirror image of leftmost column 78. In particular, the individual keys in rightmost column 99 are oriented in planes which are angularly offset from one another in the same manner as are the keys in leftmost column 78. The only difference between the orientations of the keys in columns 78 and 99 is that in column 78 the keys angle upwardly from right-to-left and the keys in column 99 the keys angle upwardly from left-to-right.

The advantage of having the keys in the cluster arrangement of keyboard 22 oriented in planes is that the angularly offset support planes for the keys allows the keys to be selectively actuated by mixed lateral, and slight endo, translation of a thumb positioned in concavity 50. Turning particularly to FIGS. 3, 4 and 5, the user moves his or her thumb 42 to a position overlying the central

row of keys 79 whenever the user elects to actuate individual keys. FIG. 4 illustrates the thumb in partial cross section with the bones of the thumb visible. The thumb is depicted as hovering directly over the middle row 79 of keys 60, 62, 64, 66. Small arrows 100, 102, 104 and 106 indicate generally the direction in which actuating force must be applied to keys 60, 62, 64, 66, respectively, in order to actuate the individual keys.

When the user intends to actuate the keys, the thumb 42 is rotated downwardly onto the keyboard. In that position, each key in the keyboard can be actuated by slight gestural movements of the thumb. For example, the tip of the thumb 108 can exert a force in the direction of arrow 100 on key 60 by a slight endo movement of the thumb in the direction of arrow 110. A slight downward movement of tip 108 exerts an actuating movement in direction of arrow 102 on key 62. A slight flexure of the thumb in the region of the interphalangeal joint 112, flexing the joint downwardly together with a slight endo movement of the thumb, exerts a force in the direction of arrow 104 on key 64. Finally, a downward flexion of interphalangeal joint 112 with a slight retracting movement of the thumb, in the direction opposite to arrow 110, exerts a actuating force in the direction of arrow 106 on key 66.

Referring again to FIG. 3, the keys 70, 72, 74, 76 in the left column 78 of keys are actuated in a manner similar to that just described for the central column 79. If thumb 42 is rotated or moved slightly laterally to the left (as viewed in FIG. 3) and the

gestural motions described in the last paragraph for actuating keys 60, 62, 64, 66 are repeated, keys 70, 72, 74, 76 are selectively actuated. In other words, a slight left lateral shift in the orientation of the forces exerted on the keyboard allows the user to selectively actuate the keys in left column 78. The keys in right column 99, namely, keys 120, 122, 124, 126 are similarly actuated by a slight right lateral movement of thumb 42, coupled with the gestural motions described in the preceding paragraph.

The thumb-actuated keyboard of the present invention requires only a small amount of movement of the user's thumb to selectively actuate any of the keys of the keyboard. The thumb need only be moved within a small cone of motion illustrated generally with dashed lines at 130 in FIG. 3 in order to actuate any individual key. The operative cone of motion 130 of the user's thumb has an apex adjacent the base of the thumb at 132, in the region of the joint between the first phalanx 134 and the first metacarpal bone 136. The user can move the thumb to any position within the cone of motion in order to operate the keys on keyboard 22. Or the thumb can be moved to a rest position away from keyboard 22 and outside the cone of motion whenever the user is not engaging the keyboard or entering information into the device via the keyboard.

Another way of describing the positions of the keys 52 in cavity 50 is to identify the keys in relationship to the thumb of the user when it is positioned in concavity 50. All the keys are supported on wall surfaces of concavity 50 in orientations which

are angularly offset from one another, as described above. Referring to FIGS. 3, 4 and 5, the top row of keys 60, 70 and 120 are arrayed generally radially about the tip or distal end 110 of thumb 42 (see FIG. 4). Keys 60, 70 and 120 are positioned on a distal wall of concavity 50 which angles downwardly into the concavity and includes support plane 80 for key 60, support plane 90 for key 70, and a support plane which is a mirror image of support plane 90 for key 120.

The bottom row of keys on keyboard 22 include keys 66, 76 and 126. Those keys are closest to the proximal end of the user's thumb and are supported on a proximal wall of concavity 50 which angles downwardly into the concavity and supports keys 66, 76 and 126. The bottom row of keys are arrayed generally radially about the first phalanx 134 (see FIG. 4) of thumb 42 when the thumb is positioned in the concavity. The proximal wall of the concavity includes key support planes 86, 96 and a mirror image of plane 96 supporting key 126.

The medial keys of the keyboard 22 include keys 62, 64, 72, 74, 122 and 124. The medial keys are supported on medial wall surfaces of concavity 50 in orientations which array the keys generally radially about the first phalanx 134 (see FIG. 4) of thumb 42 when the thumb is positioned in the concavity. The medial key support planes include planes 82, 84 supporting keys 62, 64, respectively; planes 92, 94 supporting keys 72, 74, respectively; and support planes which are mirror images of planes 92, 94 supporting keys 122, 124, respectively.

The arrangement of the keys in the thumb-actuable key cluster 22 provides a means for entering information into an electronic system via a keyboard utilizing only thumb actuation. Moreover, only limited gestural key-actuation motion of the thumb is required in order to operate the keyboard.

The present invention can also be incorporated into other types of devices. FIGS. 7 and 8 illustrate alternative embodiments of the present invention. In FIG. 7, a thumb-actuable keyboard 22 identical to the keyboard described above is incorporated into a hand-held device 140, which is a generic representation of a device for performing any desired task. Device 140 can be, for example, a control stick on a substantially larger piece of machinery. It can also be a hand-held device for scanning objects which pass beneath its base 142. It can be a hand-held calculator or another type of computational device. Or it can be an inventory control or other simple data entry device. FIG. 8 shows an alternative embodiment of a portable telephone 150 incorporating a keyboard 22 identical with the keyboard of the first embodiment. In this portable telephone 150, the keyboard is positioned on the side 154 of the telephone instead of on the back. Other potential applications for hand-held devices which include the thumb-associable keyboard of the present invention include video game controllers, robotics controllers, hand-held remote controller units for television sets, or model toy and airplane controllers. To further enhance the viability and usefulness of the overall system it may be ideal to modify the

electronic system to which the keyboard is attached to include preprogrammed speaker-transmitted voice responses to the individual keystrokes actuated by the user.

While the preferred embodiment of the invention has been described herein, it is appreciated that variations and modifications will become apparent to those skilled in the art and may be made without departing from the spirit of the invention.

What is claimed is:

1. A hand-held device for entering information into an electronic system via a keyboard, the device comprising:

a housing having a grippable portion which permits the device to be held in one hand with the thumb free to move at least temporarily to a predetermined key-actuation position while the device is held,

a concavity in said housing at said key-actuation position, and

a thumb-associable cluster of keys forming a keyboard within said concavity, each of the plurality of keys in said cluster being selectively actuable via mixed lateral, and slight endo, translation of a thumb within said concavity, whereby information is entered into an electronic system.

2. A device as in claim 1 in which said keys are located in said concavity within a cone of motion of a user's thumb, when the thumb is positioned in said concavity, whose apex resides adjacent the base of the thumb.

3. A device as in claim 1 wherein said cluster of keys includes individual keys oriented in planes which are angularly offset from one another to permit selective actuation by said mixed lateral, and slight endo, translation of a thumb positioned in said concavity.

4. A device as in claim 1 in which said concavity in said housing includes wall surfaces for supporting individual keys in said cluster in orientations which are angularly offset from one another, including a distal wall which angles downwardly into said concavity and supports a plurality of distal keys arrayed generally radially about the tip of a thumb when positioned in said concavity, a proximal wall which angles downwardly into said concavity and supports a plurality of proximal keys arrayed generally radially about the first phalanx of a thumb when positioned in said concavity, and a plurality of medial wall surfaces supporting a plurality of medial keys in orientations which partially surround the interphalangeal joint of a thumb when positioned in said concavity.

5. A device as in claim 1 in which said grippable portion is a handle which can be gripped between the fingers and thenar eminence of a user's hand, whereby when the device is gripped thus, the user's

thumb is selectively movable into said concavity without the user losing a grip on the device.